A CASE STUDY: DETECTING COUNSELOR REFLECTIONS IN MOTIVATIONAL INTERVIEWING

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MISC: hard to learn, costly to implement, does not scale, inconsistent, boring?
Automatic Coding or: How I Learned to Stop Worrying and Love MISC

“Gee, I wish I had one of them automatic MI assessment machines.”

General “Buck” Turgidson
MI RESEARCH PROCESS

MI Spirit 9/10
Empathy 8/10
Reflective Listening 8/10
Open Questions 7/10
...

Session Assessment

Session Transcript

Transcriber

Trained Coder

Coded Transcript
### AUTOMATIC CODING

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The process involves:

- **Transcriber**: Records the session.
- **Session Transcript**: Transcription of the recorded session.
- **Computer**: Analyzes the transcript for coding.
- **Coded Transcript**: The final output of the coded session.

The diagram illustrates the workflow from transcription through coding to the final coded transcript.
On the one hand, you have decided that to quit drinking is going to be the best thing for you...

Therapist (T)

you

you have decided

for you

best thing for you

independent variables
(a.k.a. features)

think of multinomial logistic regression

predictions

Session Transcripts
On the one hand, you have decided that to quit drinking is going to be the best thing for you...

Therapist (T)  
you have decided for you

Code Predictor

<table>
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<tr>
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<tbody>
<tr>
<td>REC</td>
<td>0.3</td>
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<td>QU</td>
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independent variables (a.k.a. features)

think of multinomial logistic regression

predictions

Session Transcripts

Coded Transcripts
On the one hand, you have decided that to quit drinking is going to be the best thing for you... Not so fast!

57 sessions, 2 coders per session (on average)
Good morning, Susan

I’d like to start by talking about our last conversation.

What will you put in place of drinking?

That’s what I’m trying to find out.

On the one hand, you have decided that to quit drinking is going to be the best thing for you...

Uh-huh.

and on the other hand you feel like it’s going to be really tough.

Yeah.
Good morning, Susan

I’d like to start by talking about our last conversation.

What will you put in place of drinking?

That’s what I’m trying to find out.

On the one hand, you have decided that to quit drinking is going to be the best thing for you...

Uh-huh.

and on the other hand you feel like it’s going to be really tough.

Yeah.
WHY REFLECTIONS?

1. They are believed to be critical for MI efficacy.
2. They encode a non-trivial counselor behavior.
3. They are challenging to model/describe.
Can Language Predict Reflections?

1. Reflections are semantically similar to prior client talk.

2. A common language is shared across reflections.
   Counselors tend to use predictable language constructs while reflecting, e.g. “From what I’m hearing”, “It seems like”

3. Local dialog context can predict reflections.
   Reflections tend to occur in bursts. They usually prompt the client to confirm or deny, e.g. “Yeah”, “Not really”
Reflections

Typical reflective constructs:
- repeat, rephrase or summarize
- add meaning or emphasis
- analogies, metaphors, similes, etc.
- in response to client statement
- trigger confirmation by client
- collaborative, non-judgmental, emphatic

Independent Variables

Expert knowledge driven features:
Reflections

Typical reflective constructs:

- repeat, rephrase or summarize
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in response to client statement

trigger confirmation by client

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Independent Variables

Expert knowledge driven features:

n-grams (n consecutive words)
Reflections

Typical reflective constructs:

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Independent Variables

Expert knowledge driven features:

- n-grams (n consecutive words)
- contextual n-grams
Reflections

Typical reflective constructs:
- repeat, rephrase or summarize
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- in response to client statement
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Independent Variables

Expert knowledge driven features:
- n-grams (n consecutive words)
- contextual n-grams
- meta (speaker, codes)
## Reflections

Typical reflective constructs:

- Repeat, rephrase or summarize
- Add meaning or emphasis
- Analogies, metaphors, similes, etc.
- In response to client statement
- Trigger confirmation by client
- Collaborative, non-judgmental, emphatic

## Independent Variables

Expert knowledge driven features:

- N-grams (n consecutive words)
- Contextual n-grams
- Meta (speaker, codes)
- Similarity (n-gram sharing)
I wouldn't mind coming here for treatment but I don’t want to go to one of those places where everyone sits around crying and complaining all day.

T You don’t want to do that.

T So you’re kind of wondering what it would be like here.

P Yeah

n-gram:  
T:=:you
T:=:you do not want

contextual_n-gram:  
P:-:i would not
T:+:so you are

meta:  
P:T
P:T_P

similarity:  
want
do not want to

CL:  
CL:T
CL:T_P
I wouldn't mind coming here for treatment but I don't want to go to one of those places where everyone sits around crying and complaining all day.

You don't want to do that.

So you're kind of wondering what it would be like here.

Yeah.
Average numbers from leave one out cross validation experiments.

F-score: harmonic mean of precision (positive predictive value) and recall (sensitivity)

\[ F\text{-score} = \frac{2 \times \text{TruePos}}{2 \times \text{TruePos} + \text{FalseNeg} + \text{FalsePos}} \]
STYLE vs CONTENT

Reflection Production

• Is style as important as the content?

• Is reflection a local process?

Reflection Perception

• Are coders affected by the speaking style?

N-gram sharing not helpful?

• Weak feature for measuring similarity, data sparsity

• High baseline: nature of dialog + professional counselors
IN THE WORKS

1. Extension to the larger code sets

2. Acoustic/prosodic features

3. Speech recognition instead of manual transcripts
DO WE NEED ANNOTATORS?

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Transcriber

Computer

Annotated Transcript (MISC)
DO WE NEED TRANSCRIBERS?

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Annotated Transcript (MISC)
DO WE NEED TRANSCRIPTS?

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WHY NOT DO IT ONLINE?

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Profit!